Focus on Low-Activity Waste Treatment Alternatives

Ecology's View

Ecology's preferred alternative for low-activity waste (LAW) treatment is 2B, which is the Waste Treatment Plant (WTP) combined with a second low-activity waste (LAW) vitrification facility. We support Alternative 2B and want the U.S. Department of Energy (USDOE) to drop Alternatives 2A, 3A, 3B, 3C, 4, and 5 from its tentative list of preferred alternatives for tank waste treatment.

Our highest priority for Hanford tank waste is to remove waste from single-shell tanks (SSTs) as soon as possible. These tanks do not comply with state regulations. They are aging, and 67 of them have leaked.

The required mitigation for waste in noncompliant aging SSTs is to provide more LAW treatment capacity to retrieve and treat the waste as quickly as possible. Alternative 2B is the best approach to meeting this goal.

A second LAW vitrification facility would most effectively immobilize radionuclides and chemicals with the highest long-term risk to human health. It would add no technology risk or uncertainty about waste form performance.

What the Draft EIS Says

Alternatives 2B, 3A, 3B, and 3C compare expanded WTP vitrification and three other treatment technologies (bulk vitrification, cast stone, and steam reforming). USDOE has not stated a preference for supplemental treatment technologies.

Under Alternatives 2B and 3B, USDOE would remove technetium-99 from the low-activity waste stream. Technetium-99 is long-lived and mobile.

MORE INFORMATION

The Tank Closure & Waste Management Environmental Impact Statement (EIS) will support decisions for the final cleanup of much of the waste at Hanford -- the tank farms, the rest of the waste in the tanks, and the Fast Flux Test Facility.

The draft EIS also analyzes impacts to groundwater from waste disposal activities to determine whether it is safe for Hanford to dispose of more wastes.

Comments accepted through March 19, 2010.

Send comments to:

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TERMS TO KNOW

Integrated Disposal Facility - A lined and permitted disposal facility for radioactive wastes- both those mixed with dangerous wastes and strictly radioactive wastes. The IDF in 200 East Area is near the Waste Treatment Plant and will be the disposal site for immobilized LAW.

Low-Activity Waste (LAW) - Low-activity waste is the part of high-level waste that is not as highly radioactive, which remains after pretreatment to remove transuranic waste and cesium-137.

Technetium-99 - One of the main drivers of risk in Hanford's tank wastes. It is long-lived and very mobile.

Vitrification– The process of making glass.

Waste Treatment Plant -- The plant under construction at Hanford to immobilize tank waste in glass. The plant (informally known as the vit plant) is supposed to start operating in 2019.

Alternatives 3A, 3B, and 3C include retrieval of transuranic waste from selected tanks for disposal at the Waste Isolation Pilot Plant in New Mexico. (USDOE has since formally dropped consideration of this proposal, though it remains in USDOE planning assumptions.)

Appendix E of the draft EIS describes uncertainties for each of these treatment technologies. Expanded WTP vitrification would use the same technology in WTP's LAW vitrification facility, so it would not add technology risk. Bulk vitrification and steam reforming would each require further development to overcome engineering and production challenges and to reduce uncertainties about waste form performance. Cast stone engineering and production may be mature, but the technology would need further development to prevent the key contaminants from leaching.

Alternative 2A proposes no supplemental treatment at all. The WTP's pretreatment and high-level waste (HLW) facilities could not operate at full capacity. This would extend tank waste treatment for decades beyond WTP's design life. USDOE would have to build an entirely new WTP to replace the worn out one. Because waste could not be treated as quickly, USDOE would also need to build new double-shell tanks.

Ecology's Analysis

Capacity

The LAW treatment capacity in the current design of the WTP is mismatched with the HLW vitrification capability. The LAW treatment capacity in the WTP covers only 30-40 percent of Hanford's LAW. To ensure that WTP runs at full capacity at startup in 2019, we must choose the supplemental treatment soon. That treatment should be a second LAW vitrification facility.

Why We Prefer LAW Vitrification

Ecology prefers waste treatment technologies that minimize long-term risk to groundwater from waste disposed onsite. What drives the risk to groundwater from tank waste are iodine-129, technetium-99, uranium, chromium, and nitrate. The following table describes what would be released to the groundwater during the 10,000 year-period after disposal of vitrified tank waste in the Integrated Disposal Facility (IDF):

Contaminants of Potential Concern (COPCs)	Alternative 2B Expanded WTP	Alternative 3A Bulk Vitrification	Alternative 3B Cast Stone	Alternative 3C Steam Reforming
iodine-129 (Ci)	~1	~1	~1	~10
technetium-99 (Ci)	~250	~2,100	~4,100	~20,000
chromium (kg)	~2,000	~1,000	~40,000	~400,000
nitrate (kg)	~9,000,000	~9,000,000	~50,000,000	~9,000,000

The WTP will recycle contaminants captured in the LAW facility's melter offgas treatment system. But the draft EIS did not evaluate this recycling (except in the form of a sensitivity study in Appendix N, which Ecology requested). When recycling is considered, Alternative 2B captures far more iodine-129 than the other alternatives. Ecology estimates for iodine that the release to groundwater under alternative 2B will be about half of that released under alternative 3A and 3B, and about 20 times less than that released under alternative 3C.

The table below (from draft EIS Tables O-48 through O-51) shows the estimated maximum concentrations in groundwater at the IDF boundary for each of the main contaminants. It also shows the "Benchmark Concentration" related to drinking water standards. (Uranium is less mobile and not expected to reach groundwater during the 10,000-year period after waste disposal in IDF.)

COPCs	Alternative 2B	Alternative 3A	Alternative 3B	Alternative 3C	Benchmark Concentration
iodine-129 (pCi/L)	1.4	1.7	0.7	10.7	1
technetium-99 (pCi/L)	471	1,604	5,022	29,171	900
chromium (mcg/L)	4	2	436	436	100
nitrate (mcg/L)	14,243	14,381	50,234	14,512	45,000

It is important to note that most of the 471 picocuries per liter in alternative 2B comes from secondary waste and not from immobilized LAW glass. In the draft EIS, USDOE calculated these values using an infiltration rate of 0.9 mm per year. We think the tables clearly show why an all-vitrification option is preferable and is the only option acceptable to Ecology.

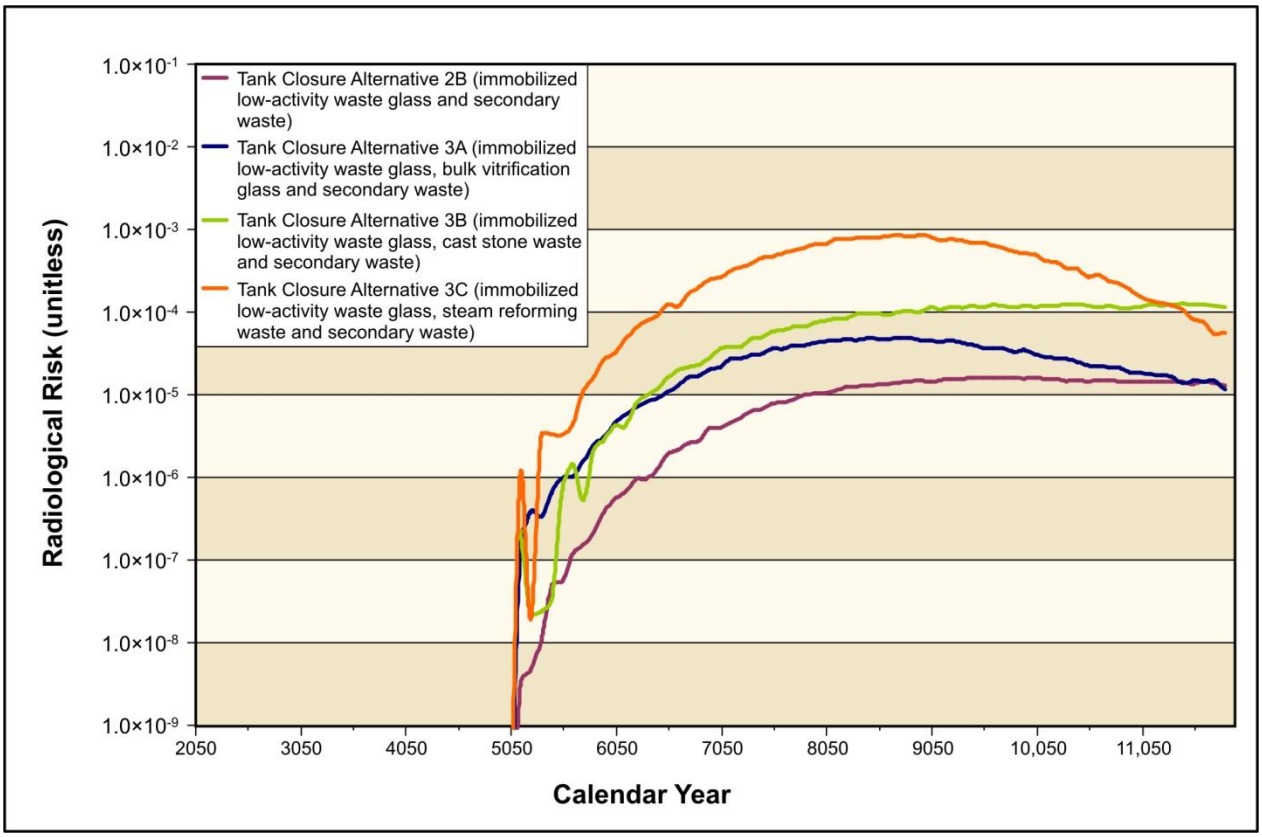

Figure S-15 from the draft EIS summary.

This figure compares the impact of the various waste treatment technologies combined with their secondary waste after disposal. This figure clearly shows why an all-vitrification option with robust mitigation of secondary waste is Ecology's preferred choice.

View the draft EIS online at http://www.gc.energy.gov/nepa or www.hanford.gov